AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A Bluetooth network processing method, comprising:

providing a plurality of piconets, each of which comprises a plurality of Bluetooth units, including one master unit and a plurality of slave units; and

linking the piconets using the slave units to form a scatternet ring, wherein the slave units act as a bridge to connect the piconets;

wherein the piconet linking step uses a centralized formation mechanism to form the scatternet ring, and the scatternet ring is a closed single-ring Bluetooth network connected by a circle of piconets.

2. (Canceled)

3. (Canceled)

4. (Currently Amended) The method as claimed in claim [[3]]1, wherein the piconet comprises a master unit, a downstream bridge, and an upstream bridge.

5. (Original) The method as claimed in claim 4, further comprising the step of appending a plurality of control bit fields to a packet payload for routing the packet from its source to its destination, wherein the control bit fields comprise a relay bit field, a dirty bit field, a broadcast bit field, a source address field and a destination address field.

6. (Original) The method as claimed in claim 5, wherein the dirty bit field indicates the source of the packet.

7. (Original) The method as claimed in claim 5, wherein the broadcast bit field indicates whether the packet is a unicast packet or a broadcast packet.

8. (Original) The method as claimed in claim 7, further comprising the step of providing a routing direction in the scatternet ring and a routing protocol to transmit the packet from its source to its destination.

9. (Original) The method as claimed in claim 8, further comprising the steps of:

transmitting a first packet to a first slave unit;

checking a first relay bit field in the first packet to determine whether the first packet is targeted to a first downstream master of the first slave;

checking a first dirty bit field in the first packet when the first packet is not targeted to the first downstream master, in order to determine whether the first packet is targeted to the first slave;

checking a first broadcast bit field in the first packet when the first slave is not a downstream bridge, in order to determine whether the first packet is a broadcast packet;

receiving the first packet when the first packet is not a broadcast packet;

duplicating the first packet and setting the first relay bit field to 1 when the first packet is a broadcast packet; and

receiving one of the first packet duplicates and transmitting another duplicate to the first downstream master.

10. (Original) The method as claimed in claim 9, wherein the step of checking the relay bit field further comprises transmitting the first packet to the first downstream master when the first relay bit field has a TRUE value.

11. (Original) The method as claimed in claim 9, wherein the step of checking the dirty bit field further comprises the assessing a first upstream master of the first slave as the source of the first Bluetooth packet when the first dirty bit field has a FALSE value.

12. (Original) The method as claimed in claim 11, further comprising assessing the first packet as having been relayed and checking the SA field of the first packet to determine the source of the first packet when the first dirty bit field has a TRUE value.

13. (Original) The method as claimed in claim 8, further comprising the steps of:

transmitting a second packet to a first master unit;

checking a second relay bit field in the second packet to determine whether the second packet is targeted to the first master;

discarding the second packet when the second packet, which has a TRUE value in its second dirty bit field, is not targeted to the first master and has a source within the current piconet;

reassigned a TRUE value to the second dirty bit field when the second packet is not targeted to the first master and has a FALSE value in its dirty bit field;

duplicating the second packet when the second packet is a broadcast packet;

broadcasting one duplicate to the current piconet and receiving another duplicate;

receiving the second packet when the second packet is not a broadcast packet and is targeted to the first master;

determining whether the second packet is targeted to a first destination unit within the current piconet when the second packet is not targeted to the first master;

transmitting the second packet to the downstream bridge of the first master when the second packet is not targeted to the first destination unit; and

transmitting the second packet to the first destination unit and reassigning a FALSE value to the second relay bit field in the second packet when the second packet is targeted to the first destination unit.

14. (Original) The method as claimed in claim 13, wherein the step of checking the source of the second packet further comprises determining whether the source of the second packet is the first master.

15. (Original) The method as claimed in claim 13, wherein the step of resetting the dirty bit is performed to detect orphan packets or excess circulated packets.

16. (Original) The method as claimed in claim 13, wherein the discarded packet is an orphan packet or an excess circulated packet.

17. (Original) The method as claimed in claim 13, further comprising assessing the second packet as an unicast packet and determining whether the second packet is targeted to transfer when the second packet has a FALSE value in its broadcast bit field.

18. (Original) The method as claimed in claim 8, wherein the packet is routed from its source unit to destination unit by single-hop unicasting, multi-hop unicasting, or broadcasting.

19. (Original) The method as claimed in claim 18, wherein the single-hop unicasting is used when the source unit links directly with the destination unit within the same piconet.

20. (Original) The method as claimed in claim 19, wherein the relay bit is set to 0 when single-hop unicasting is adopted.

21. (Original) The method as claimed in claim 18, wherein the multi-hop unicasting is used when the source unit and the destination unit do not connect directly or belong to different piconets.

22. (Original) The method as claimed in claim 21, wherein the relay bit is set to 1 when multi-hop unicasting is adopted.

23. (Original) The method as claimed in claim 22, wherein the routing is terminated at the master of its destination piconet when multi-hop unicasting is adopted.

24. (Original) The method as claimed in claim 18, wherein broadcasting is used when the Bluetooth packet is targeted to all units in the scatternet ring.

25. (Original) The method as claimed in claim 24, wherein the relay bit is set to 0 and broadcast over the current piconet when the source of the packet is the master.

26. (Original) The method as claimed in claim 25, wherein the downstream bridge of the issuing master assesses the packet as a broadcast packet needing relay by checking the content of the packet, resets the relay bit to 1, and forwards the packet to the downstream master of the downstream bridge.

27. (Original) The method as claimed in claim 8, further comprising the steps of:

detecting the leaving of a third master;

relieving a third downstream bridge of the third master of its bridge service;

causing a third downstream master of the third master to perform a DIAC 1 inquiry;

causing a third upstream bridge of the third master to perform a DIAC 1 inquiry scan;

establishing connection between the third downstream master and the upstream bridge when the third downstream master discovers the third upstream bridge; and

establishing connection between the third downstream master and at least one master-free unit discovered by the third downstream master through the GIAC inquiry scan.

28. (Original) The method as claimed in claim 8, further comprising the steps of:

detecting the leaving of a fourth bridge;

causing a fourth downstream master of the fourth bridge to perform a DIAC 1 inquiry;

designating a non-bridge slave of a fourth upstream master of the fourth bridge for a fifth downstream bridge; and

causing the fifth downstream bridge to perform a DIAC 1 inquiry scan to be discovered by the fourth downstream master as a new upstream bridge.

29. (Original) The method as claimed in claim 28, further comprising relieving the fourth upstream master of its master service and causing the fourth upstream master to perform a GIAC inquiry scan to be discovered by a master when the fourth upstream master has no non-bridge slave.

30. (Original) The method as claimed in claim 8, further comprising providing an extension mechanism to split the piconet when the number of slaves in the piconet exceeds a critical value, wherein the extension mechanism takes advantage of the GIAC, the DIAC 1, and the DIAC 2.

31. (Original) The method as claimed in claim 30, further comprising:

adding a unit to a sixth piconet in the scatternet ring, wherein the sixth piconet comprises a sixth master, a sixth upstream bridge, a sixth downstream bridge, a seventh slave, and an eighth slave;

determining to split the sixth piconet when the sixth piconet has more slaves than a critical number;

transmitting a split request message from the sixth master to other masters in the scatternet ring;

breaking the connection between the sixth master and the sixth upstream bridge, the seventh slave, and the eighth slave respectively, and performing the DIAC 2 inquiry;

causing the sixth upstream bridge to perform the DIAC 1 inquiry scan when it detects the leaving with the sixth master;

designating the seventh slave for a seventh master of a newly forming seventh piconet;

designating the eighth slave for an eighth downstream bridge of the seventh master;

causing the seventh master to perform the DIAC 1 inquiry to discover the sixth upstream bridge; and

causing the eighth downstream bridge to perform the DIAC 2 inquiry scan to establish connection with the sixth downstream bridge.

32. (Original) The method as claimed in claim 31, wherein the split request message issued by the sixth master is routed throughout the scatternet ring to obtain split permission from other masters in the scatternet ring.

33. (Currently Amended) A Bluetooth network system, comprising a plurality of piconets arranged in a circle, wherein each of the piconet comprises a plurality of Bluetooth units, including one master unit and a plurality of slave units linking the piconets to form a scatternet ring, wherein the slave units act as a bridge to connect the piconets, and

wherein the scatternet ring is formed by a centralized formation mechanism, and the scatternet ring is a closed single-ring Bluetooth network connected by a circle of piconets.

34. (Canceled)

35. (Canceled)

36. (Original) The Bluetooth network system as claimed in claim 33, wherein the piconet comprises a master unit, a downstream bridge, and an upstream bridge.

37. (Original) The Bluetooth network system as claimed in claim 36, wherein a packet conveying data between units has a payload with a relay bit field, a dirty bit field, a broadcast bit field, a source address field and a destination address field.

38. (Original) The Bluetooth network system as claimed in claim 37, wherein the dirty bit field indicates the source of the packet.

39. (Original) The Bluetooth network system as claimed in claim 38, wherein the broadcast bit field indicates whether the packet is a unicast packet or a broadcast packet.

40. (Original) The Bluetooth network system as claimed in claim 39, wherein the scatternet ring has a direction for routing packets.

41. (Original) The Bluetooth network system as claimed in claim 40, wherein a first slave unit receives a first packet, checks a first relay bit field in the first packet to determine whether the first packet is targeted to a first downstream master of the first slave, checks a first dirty bit field in the first packet if the first packet is not targeted to the first downstream master, in order to determine whether the first packet is targeted to the first slave, checks a first broadcast bit field in the first packet if the first slave is not a downstream bridge, in order to determine the first packet is a broadcast packet, receives the first packet when the first packet is not a broadcast packet, duplicates the first packet and sets the first relay bit field to 1 when the first packet is a broadcast packet, receives one of the first Bluetooth packet duplicates, and transmits another duplicate to the first downstream master.

42. (Original) The Bluetooth network system as claimed in claim 40, wherein a first master unit receives a second packet, checks a second relay bit field in the second packet to determine whether the second packet is targeted to the first master, discards the second packet if the second packet having a TRUE value in its second dirty bit field is not targeted to the first master and has a source within the current piconet, reassigns a TRUE value to the second dirty

bit field if the second packet is not targeted to the first master and has a FALSE value in its dirty bit field, duplicates the second packet when the second packet is a broadcast packet, broadcasts one duplicate to the current piconet and receives another duplicate, receives the second packet if the second packet is not a broadcast packet and is targeted to the first master, determines whether the second packet is targeted to a first destination unit within the current piconet if the second packet is not targeted to the first master, transmits the second packet to the downstream bridge of the first master when the second packet is not targeted to the first destination unit, and transmits the second packet to the first destination unit and reassigned a FALSE value to the second relay bit field in the second packet when the second packet is targeted to the first destination unit.

43. (Original) The Bluetooth network system as claimed in claim 40, wherein the packets are routed from source unit to destination unit by single-hop unicasting, multi-hop unicasting, or broadcasting.

44. (Original) The Bluetooth network system as claimed in claim 43, wherein the single-hop unicasting is used when the source unit links directly with a destination unit within the same piconet.

45. (Original) The Bluetooth network system as claimed in claim 43, wherein multi-hop unicasting is used when the source unit and the destination unit do not connect directly or belong to different piconets.

46. (Original) The Bluetooth network system as claimed in claim 43, wherein broadcasting is used when the packet is targeted to all units in the scatternet ring.

47. (Original) The Bluetooth network system as claimed in claim 40, wherein scatternet rings broken by a failure of a master or a bridge are reconnected by a recovery mechanism using a GIAC, a DIAC 1, and a DIAC 2.

48. (Original) The Bluetooth network system as claimed in claim 47, wherein a third master disconnects and causes a third downstream bridge to become a non-bridge slave, a third downstream master performs a DIAC 1 inquiry, a third upstream bridge of the third master performs a DIAC 1 inquiry scan, the third downstream master discovers the third upstream bridge and establishes connection therewith, and the third downstream master links with at least one master-free unit discovered by the third downstream master through the GIAC inquiry scan.

49. (Original) The Bluetooth network system as claimed in claim 47, wherein a fourth bridge disconnects and causes a fourth downstream master of the fourth bridge to perform a DIAC 1 inquiry, a non-bridge slave of a fourth upstream master of the fourth bridge is designated for a fifth downstream bridge, and the fifth downstream bridge performs a DIAC 1 inquiry scan to be discovered by the fourth downstream master as a new upstream bridge.

50. (Original) The Bluetooth network system as claimed in claim 49, wherein the fourth upstream master becomes a non-master unit and performs a GIAC inquiry scan to be discovered by a master when the fourth upstream master has no non-bridge slave.

51. (Original) The Bluetooth network system as claimed in claim 47, wherein any piconet with more slaves than a critical number is split by an extension mechanism using a GIAC, a DIAC 1, and a DIAC 2.

52. (Original) The Bluetooth network system as claimed in claim 51, wherein a sixth piconet comprises a sixth master, a sixth upstream bridge, a sixth downstream bridge, a seventh slave, and an eighth slave, and the sixth piconet splits when the number of slaves of the sixth piconet exceeds a critical value, and the sixth master transmits a split request message to other masters in the scatternet ring, the sixth master breaks the connection with the sixth upstream bridge, the seventh slave, and the eighth slave respectively and performs the DIAC 2 inquiry, the sixth upstream bridge performs the DIAC 1 inquiry scan when it detects the leaving with the sixth master, the seventh slave is designated as a seventh master of a newly formed seventh piconet and performs the DIAC 1 inquiry to discover the sixth upstream bridge, the eighth slave is designated for an eighth downstream bridge of the seventh master and performs the DIAC 2 inquiry scan to establish connection with the sixth downstream bridge.

53. (Original) The Bluetooth network system as claimed in claim 52, wherein the split request message issued by the sixth master is routed throughout the scatternet ring to obtain split permission from other masters.